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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Toshiro Oda

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7590

04/23/2012

GREER, BURNS & CRAIN  
300 S WACKER DR  
25TH FLOOR  
CHICAGO, IL 60606

EXAMINER

YANG, JIE

ART UNIT

PAPER NUMBER

1733

MAIL DATE

DELIVERY MODE

04/23/2012

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/590,340	<b>Applicant(s)</b> ODA, TOSHIRO	
	<b>Examiner</b> JIE YANG	<b>Art Unit</b> 1733	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2012.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 5) ☒ Claim(s) 1-15 is/are pending in the application.
- 5a) Of the above claim(s) 1-5 and 9-15 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 6-8 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/1/2012 has been entered.

### ***Status of the Claims***

Claims 1-5 and 9-15 are withdrawn as non-elected claims; Specification and claims 6-8 have been amended; and Claims 6-8 remain for examination, wherein claims 6 and 7 are independent claims.

### ***Status of the Previous Rejection***

Previous rejection of claims 6-8 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is withdrawn in view of the Applicant's amendment/remarks filed on 3/1/2012.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai et al (JP 06093388A with English abstract and machine translation, hereafter JP'388) in view of Murata et al (JP 04063247A with English abstract, hereafter JP'247).

Regarding claims 6-8, JP'388 teaches a process to inexpensively produce a high Si stainless steel by hot-forging (Abstract of JP'388), which reads on forging a silicon stainless steel with an impact load or a static load as recited in the instant claims. JP'388 teaches including about 5.0-8.0wt%Si in the alloy, which overlapping the claimed 3.5-7.0wt%Si as recited in the instant claims, which is a prima facie case of obviousness. SEE MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select a steel alloy with the claimed Si range from the disclosure of JP'388 because JP'388 discloses the same utility throughout the disclosed ranges. JP'388 teaches forging at a temperature region  $\geq 900^{\circ}\text{C}$  and finish forging temperature  $\geq 700^{\circ}\text{C}$  (Abstract of JP'388) and more specifically heating to 1050 to 1150 $^{\circ}\text{C}$  (Paragraph [0010] of

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JP'388), which overlapping the heating temperature range of 1100°C as recited in the instant claims. The finish forging temperature  $\geq 700^{\circ}\text{C}$  taught by JP'388 reads on the limitation of dropping the temperature to 950°C or below and not so low as to break the silicon stainless steel as recited in the instant claims because JP'388 further teaches to avoid crack by control the finish forging temperature (Paragraph [0021] of JP'388). Regarding the limitation of mainly grain size of 15  $\mu\text{m}$  or less as recited in the instant claims, which is recognized as a microstructure of forged Si-stainless steel depending on the material composition and working processes. As discussed above, JP'388 teaches applying the similar silicon stainless steel by the same forging operation under the similar working conditions as recited in the instant invention and JP'388 further teaches controlling the forging temperature in re-crystallization temperature region (Paragraphs [0020]-[0021] of JP'388). Therefore, the similar microstructure, for example mainly grain size of 15  $\mu\text{m}$  or less as recited in the instant claims would be highly expected in the forged Si stainless steel proceeded by the process of JP'388. MPEP 2112.01. This position is further evidenced by JP'247. JP'247 teaches a process for manufacture a high strength and high ductility

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stainless steel with high Si (1.0-7.0wt%Si) content (Abstract of JP'247). JP'247 teaches to control the grain size by hot working operation and further heat treatment to obtain fine grains of less or equal to  $1\mu\text{m}$  (Abstract and Fig.2 of JP'247), which is within the claimed grain size range of  $15\mu\text{m}$  or less as recited in the instant claims. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the hot working operation and further heat treatment as demonstrated by JP'247 in the process of JP'388 in order to obtain the desired high ductility stainless steel (Abstract of JP'247). The Examiner notes that there is no limitation to exclude further heat treatments in the instant claims.

Still regarding claim 7, JP'388 teaches a temperature range for forging: forging at a temperature region  $\geq 900^{\circ}\text{C}$  and finish forging temperature  $\geq 700^{\circ}\text{C}$  (Abstract of JP'388). It is well known in the art to perform more than one impact load or static load to finish forging in a forging temperature range. This position is further evidenced by JP'247. JP'247 provides different secondary deformations for high-Si stainless steel under different operation temperatures to obtain different forging results (Table 2

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and Fig.1-2 of JP'247). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the second deformation operation as demonstrated by JP'247 in the process of JP'388 in order to obtain the forged steel with the desired properties (Table 2 and Fig.1-2 of JP'247).

Still regarding claim 8, JP'388 teaches forging in a temperature range (Abstract of JP'388) and JP'388 does not teach heating during forging, therefore a lowest surface temperature of each second loading application step is lower than a lowest surface temperature for a previous step as recited in the instant claim would be highly expected in the process of JP'388. MPEP 2112.01. JP'247 provides evidence to show obtaining smaller grain size with forging at lower temperature range (Fig.2 of JP'247). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the secondary forging temperature according to the desired grain size as demonstrated by JP'247 in the process of JP'388 in order to obtain the forged steel with the desired properties (Table 2 and Fig.1-2 of JP'247).

### ***Response to Arguments***

Applicant's arguments filed on 3/1/2012 with respect to claims 6-8 have been fully considered but they are not persuasive.

In the remark filed on 3/1/2012, the Applicant argues:

1) JP'388 does not teach a load application step where the surface temperature is at 1100°C and then dropped to a temperature of 950°C or below as recited in the instant claims. JP'388 states that the alloy is intensely heated at a temperature region of 1050 to 1150°C, which is not relevance to a load application step as claimed in the instant invention.

2) The process of JP'388 is completely different from that the claim process. JP'388 does not teach the step of applying at least one of an impact load and a static load at a temperature range from 850°C to 1050°C, and is later change to a temperature range of 950°C or below and not so low as to break the silicon stainless steel.

3) JP'247 does not remedy the deficiencies of JP'388 because the steel disclosed in JP'247 is completely different from that of made by hot-forging as disclosed by the claimed invention and JP'247 teaches cold rolling and subsequent annealing.

In response,

Regarding the argument 1) and 2), the Examiner disagrees with the Applicant's arguments because it is common knowledge that forging process including a loading step. JP'388 clearly teaches forging at a temperature region  $\geq 900^{\circ}\text{C}$  and finish forging temperature  $\geq 700^{\circ}\text{C}$  (Abstract of JP'388) and more

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specifically heating to 1050 to 1150°C (Paragraph [0010] of JP'388), which overlapping the "surface temperature is at 1100°C and then dropped to a temperature of 950°C or below" as recited in the instant claim 6, and reads on the limitation of "applying at least one of an impact load and a static load at a temperature range from 850°C to 1050°C, and is later change to a temperature range of 950°C or below" in the instant claim 7. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply hot-forging at temperature  $\geq 700^{\circ}\text{C}$  (finished forging temperature of JP'388) to a temperature region  $\geq 900^{\circ}\text{C}$  as disclosed by JP'388. MPEP 2144.05 I.

Regarding the argument 3), the Examiner disagrees with the Applicant's argument because as pointed out in the rejection for the instant claims, JP'247 teaches a process for manufacture a high strength and high ductility stainless steel with high Si (1.0-7.0wt%Si) content, which is a similar high-Si stainless steel as recited in the instant invention. The Examiner further notes that there is no limitation to avoid hot-working (cold rolling plus heat treatment) in the instant claims, therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the second deformation operation as demonstrated by JP'247 in the process of JP'388 in order to obtain the forged steel with the desired properties and structures (Table 2 and Fig.1-2 of JP'247).

### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jie Yang/  
Primary Examiner, Art Unit 1733